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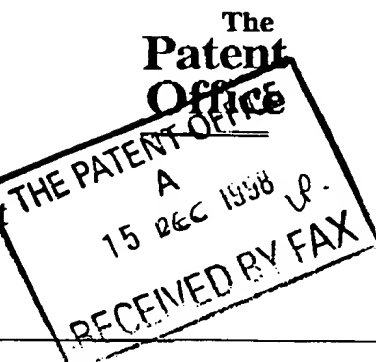
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The Patent Office

Cardiff Road
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Gwent NP9 1RH

1. Your Reference

P/6107.GBA

2. Patent application number

(The Patent Office will fill in this part)

9827537.3

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Wharfedale International Limited
I.A.G. House
Ermine Business Park
Huntingdon
Cambridgeshire PE18 6WA

15 DEC 1998

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

7060908002

4. Title of the invention

LOUDSPEAKER

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

MAGUIRE BOSS
5 Crown Street
St. Ives
Cambridgeshire
PE17 4EB

Patents ADP number (if you know it)

00009191002 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)Date of filing
(day/month/year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

Yes

- a) any applicant named in part 3 is not an inventor, or
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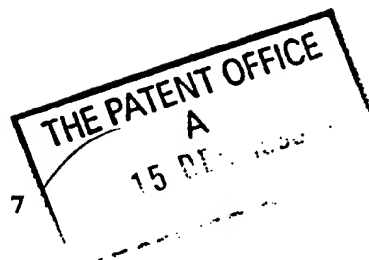
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Description

Claims(a)

Abstract

Drawing(s)



10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Date 15/12/98

MAGUIRE BOSS

12. Name and daytime telephone number of person to contact in the United Kingdom

P J EVENS

Tel: 01480 301588

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Patents Form 1/77

LOUDSPEAKER

The present invention relates to a portable
loudspeaker for use with personal CD players (e.g., Sony
DISCMAN CD players), personal mini disc players, and
5 personal stereo cassette players (e.g., Sony WALKMAN tape
cassette players). For the purposes of the present
specification, such CD/mini disc/cassette players are
defined as personal players.

Personal players are primarily intended to produce
10 sound for one listener at a time. For this reason,
personal players are supplied with headphones.
Nevertheless, portable loudspeakers are available on the
market and are intended for the odd occasions when the
personal players are used to reproduce sound for more than
15 one person at a time. The portable loudspeakers must be
compact and lightweight in order to meet user requirements.

The present applicant has appreciated that existing
portable loudspeakers for personal players are perhaps not
as compact as the user would like, so much so that storage
20 is sometimes a problem. Therefore, an object of the
present invention is to provide a portable loudspeaker
which is more readily accepted by the user.

According to a first aspect of the present invention,
there is provided a portable loudspeaker for use with a
25 personal player as hereinbefore defined, comprising a
housing having an outer periphery in the shape of a storage
device selected from the group consisting of a CD box, a
tape cassette box, and a mini disc box.

CDs, mini discs and tape cassettes are traditionally sold in standard-sized storage boxes and, as a result, there is a tendency for the users of personal players to accept readily the size of such storage boxes. Indeed, 5 accessories such as carrying cases for personal players are sometimes designed to accommodate the standard-sized storage boxes in addition to the personal player itself. Accordingly, the present applicant has appreciated that a loudspeaker with a housing of substantially the same 10 dimensions as one of the standard-sized storage boxes (be it single or double or otherwise) is likely to be more readily accepted by users of personal players because its size is in keeping with existing apparatus carried by users.

15 The housing may comprise an open-box enclosure and a lid, with the lid being movable from a first position covering the enclosure opening to a second position upstanding from the enclosure. With the lid in the second position, projecting away from the enclosure opening, the 20 interior of the enclosure becomes accessible, possibly for storing an item. The lid may be connected to the open-box enclosure with a hinge.

Preferably, the sound generating element of the portable loudspeaker is mounted on or in the lid of the 25 portable loudspeaker. In this way, the orientation of the sound generating element may be altered by moving the position of the lid relative to the open-box enclosure. This may be useful if the sound generating element produces

a directional output, or to take advantage of beneficial reflections of sound waves, e.g., from a flat surface such as a table.

A further sound generating element may also be mounted
5 in or on one side of the open-box enclosure. The said one
side may be movable relative to the other sides of the
open-box enclosure. In this way, the lid and the said one
side may be orientated to face in the same direction,
perhaps for stereo sound reproduction, whilst the other
10 sides of the open-box enclosure may project outwards to
stabilize the portable loudspeaker. The outer periphery of
the portable loudspeaker housing may be in the shape of a
double CD, tape cassette or mini disc box, in which the
said one side forms the second lid which faces the
15 aforementioned lid when closed.

The sound generating element of the portable
loudspeaker may comprise a distributed mode loudspeaker as
disclosed in International patent application number
WO97/09842 in the name New Transducers Limited, the whole
20 content of which is incorporated herein for reference.

The housing may house a battery for energizing the
sound generating element of the portable loudspeaker. The
housing may also house a radio receiver for receiving radio
wave broadcasts and subsequently reproducing sound through
25 the portable loudspeaker. The radio receiver may include
an aerial which is embedded in the housing.

According to a second aspect of the present invention,
there is provided a portable loudspeaker for use with a

personal player as hereinbefore defined, comprising a housing comprising an open-box enclosure and a lid, a sound generator mounted on or in the lid, and means coupled to the sound generator for receiving output signals from a personal player, wherein the lid is movable from a first position covering the open-box enclosure to a second position upstanding from the open-box enclosure.

The receiving means may include a socket for use in combination with a plug electrically connected to the personal player. In another embodiment, the receiving means may comprise: an infra-red receiver for use in combination with an infra-red transmitter coupled to the personal player.

The lid may be connected to the open-box enclosure with a hinge. A further sound generating element may be mounted in or on one side of the open-box enclosure, perhaps facing the enclosure opening. The said one side may be movable relative to the other sides of the enclosure, perhaps pivotally coupled thereto. The outer periphery of the housing may resemble a standard storage device selected from the group consisting of a CD box, a tape cassette box, and a mini disc box. Other features of the second aspect of the invention are as set out hereinbefore with regard to the first aspect of the invention.

Embodiments of the invention will now be described by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows schematically a first embodiment of a portable loudspeaker embodying the present invention; and

Figure 2 shows schematically a second embodiment of a portable loudspeaker embodying the present invention.

5 Figure 1 shows a portable loudspeaker (10) resembling a double CD case, and comprising left- and right-hand lids (12, 14) pivotally coupled about parallel axes AA and BB to side walling (16). The side walling (16) forms a box like enclosure, with the left- and right-hand lids (12, 14)
10 acting as the top and bottom sides to complete the enclosure. The portable loudspeaker (10) is illustrated in the "open" configuration to facilitate a description of the internal components; in the "closed" configuration (not shown), the portable loudspeaker (10) is the same shape and
15 size as a conventional double CD case, and thus has the outward appearance thereof. In the "open" configuration, the side walling (16) acts as a support stand for the portable loudspeaker (10).

Each lid (12, 14) comprises a sound generating element
20 or an acoustic radiator (20) mounted in a frame (22) with a compliant foam surround (not shown) sandwiched therebetween to isolate the frame (22) from unwanted vibrations. The acoustic radiator (20) comprises a stiff, lightweight panel (24) and an exciter (26), positioned to excite distributed
25 mode bending waves in the panel (24). The acoustic radiator (20) works in accordance with the teachings of the disclosure of WO97/09842, the whole contents of which are incorporated herein by reference, and accordingly further

explanation is unnecessary. The exciter (26) in the left-hand lid (12) is offset relative to the one in the right-hand lid (14) to avoid fouling when the portable loudspeaker (10) is in the closed configuration.

5 The side walling (16) acts as a spacer between the left and right lids (12, 14), providing storage space for certain components. An amplifier (30) including a volume control (32) is mounted in one corner of the side walling (16). The amplifier (30) is coupled to input connector
10 (34) for receiving an output setting from a personal player such as a personal cassette player (36). The input connector (34) could be replaced with a receiver for receiving infra-red output signals from a transmitter coupled to the personal player. The amplifier (30) sends
15 electrical signals to the exciters (26) via wiring (not shown) in order to generate sound. A battery (40) supplying power for the amplifier (30) is located in the corner of the side walling (16) opposite the amplifier (30); by locating the amplifier (30) and battery (40) in
20 opposing corners, space is left available to accommodate the exciters (26) when the loudspeaker (10) is in the closed configuration.

The amplifier (30) has incorporated with it a radio receiver (38) for receiving radio wave broadcasts to enable
25 radio broadcasts to be heard using the portable loudspeaker (10). The radio receiver (38) has an aerial (39) embedded in side walling (16).

Despite the presence of compliant foam isolating the acoustic radiator (20) from the frame (22), some vibrations may still be conveyed through the frame to the side walling (16). Vibrations induced in the side walling (16) may be 5 undesirable, and may be reduced by placing compliant foam absorbers (not shown) where the frames (22) may otherwise be in contact with the side walling (16).

Figure 2 shows a portable loudspeaker (50) resembling a single CD case, and comprising a lid (52) pivotally 10 coupled about axis A¹A¹ to open-box enclosure (54). Open-box enclosure (54) consists of frame (56) with an acoustic radiator (24, 26) mounted in it. The portable loudspeaker (50) is illustrated in the "open" configuration to show the internal components.

15 Where there are features in common with the embodiment of Figure 1, the same reference numerals have been used. A slimline battery arrangement (58) is illustrated, and the amplifier omitted for convenience. In any event, a miniature digital amplifier could be used in place of the 20 somewhat larger analogue amplifier illustrated in Figure 1. A key difference between the figure 1 and 2 embodiments is the fact that there is no independent side walling so that the lid (52) is hinged direct to the frame (56). The acoustic radiator (24, 26) in the frame (56) is optional 25 and if only one acoustic radiator is required in the portable loudspeaker (50), a standard panel (60) would be used to complete the enclosure. A stereo signal could still be reproduced by using a pair of such loudspeakers.

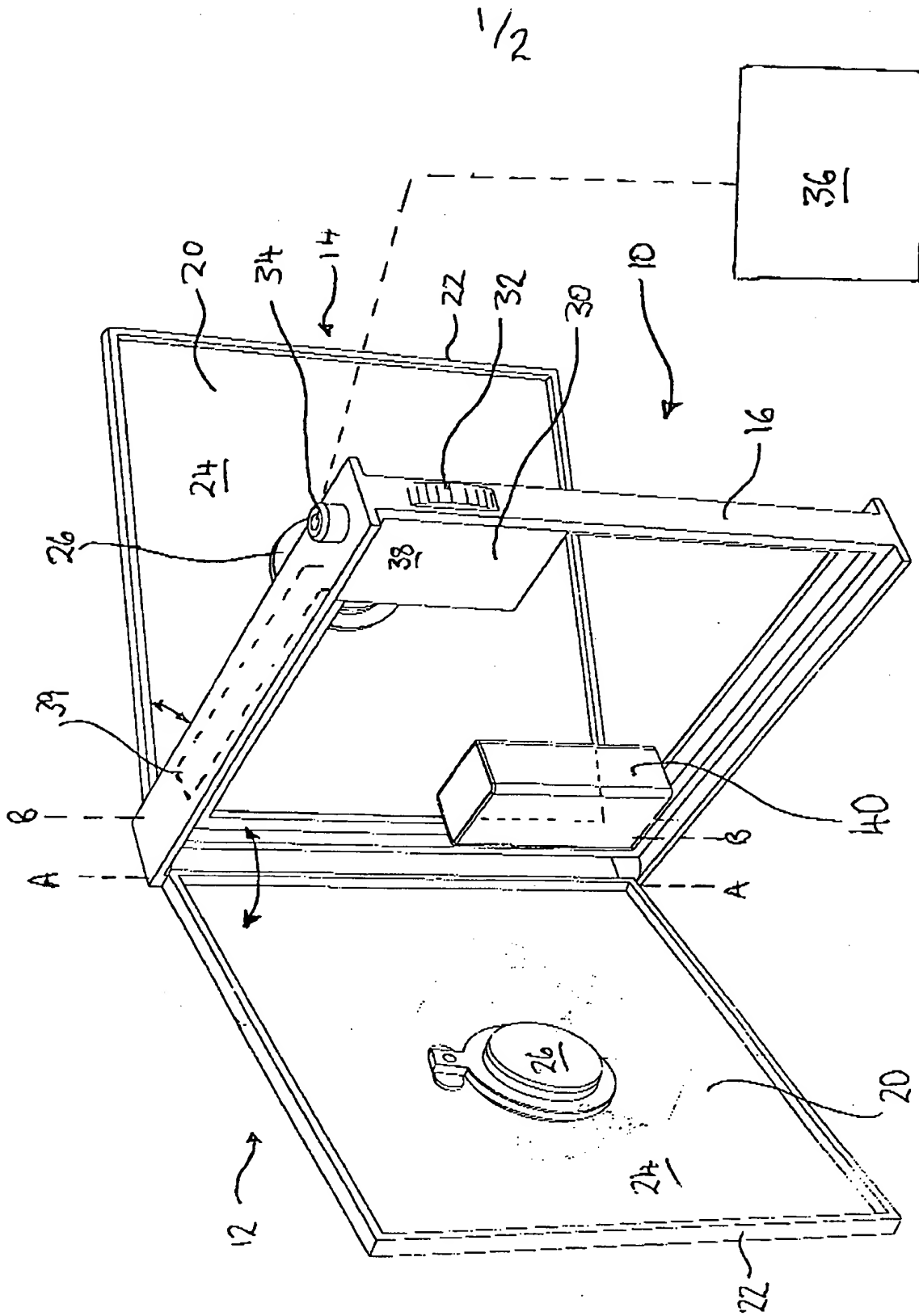


FIGURE 1

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